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MOBILES FOR EDUCATION EVALUATION ABSTRACTS



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Caption: Keyan students play a mobile game.

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FORWARD

This volume of technology for education evaluation abstracts draws on four research reports produced collaboratively under the Mobiles for Education (mEducation) Alliance. Each volume in this series aims at fostering cost-effective and scalable uses of technology to support education, particularly in developing countries. “Mobile” technologies are broadly defined here to include a range of technology and media including phones, e-readers, tablet computers, flash memory, micro/pico projectors, audiovisual devices, and other similar technologies. The reports from which evaluation abstracts have been culled for this volume include:

- **Mobiles for Reading: A Landscape Research Review**, 2014, commissioned by the United States Agency for International Development (USAID) and prepared by JBS International Inc, which includes information about 25 evaluations.
- **Landscape Review: Mobile Education for Numeracy**, 2014, commissioned by the German Federal Enterprise for International Cooperation (GIZ) and prepared by Garth Spencer-Smith and Nicky Roberts, Kelello Consulting, describing 8 evaluations.
- **Landscape Review: Mobiles for Youth Workforce Development**, 2013, commissioned by USAID and prepared by the Aguirre Division of JBS International Inc., including 23 evaluation descriptions.
- **Educational Technology Topic Guide**, 2014, commissioned by the British Government’s Department for International Development (DFID) and prepared by the Health & Education Advice & Resource Team (HEART), which describes 7 evaluations.

Evaluations included in this volume include both performance and impact evaluations which report on a number of outcomes relevant to ICT4E ranging from attitudes towards the technology to measurements of learning gains. The abstracts have been culled into groups based on the internal validity of their evaluation design with the most robust examples including a comparison or control group mimicking the counterfactual (what would happen in absence of the intervention). Studies with higher internal validity impact the ability of researchers to draw causal conclusions, which gives a clear picture of what works and, just as importantly, what does not. Expanding the use of impact evaluation (those studies with a strong counterfactual) is an important priority for mEducation Alliance members as such evaluations provide the most concrete evidence of efficacy and effectiveness available. Importantly, rigorous studies that document the effect size (or difference between pre and post intervention outcome measures for treatment and non-treatment groups) are essential for making serious comparisons regarding the impact between two or more ICT4E interventions. While some ICT4E evaluations meet this standard, they are still all too rare.

We welcome suggestions for improving this volume in subsequent iterations, as we begin the process of archiving evaluations for the education technology field in a manner that can be easily accessed by anyone who hopes to learn from these evaluations, or to plan a new one themselves.

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METHODOLOGY

Source material for this product was taken from three Information and Communication Technology for Education (ICT4E) Landscape Reviews: USAID's Mobiles for Reading, GIZ's Mobiles for Numeracy, and USAID's Mobiles for Youth Workforce Development. All studies marked as having completed an evaluation were extracted and efforts were made to locate relevant reports. Where primary source material was available, the research team copied and pasted the abstract (or parts of the executive summary). When source material was unavailable, the team relied on the summary provided in the landscape review. In some cases, certain abstracts were too long to be presented in their entirety and were edited by the team; instances where this occurred are clearly marked where appropriate.

After the abstracts were collected, the team coded each evaluation based upon the general thematic area and evaluation methodology. The thematic areas were mutually agreed upon as being important to the field by USAID and the research team before evaluations were coded. The evaluation design was determined by applying the following criteria:

Designs Examining Causality

Experimental Design

- Baseline and endline present
- Randomized control group serves a counterfactual

Quasi-Experimental Design

- Baseline and endline measure present
- Non-randomized comparison group serves as a counterfactual

Non-Experimental Designs

- Evaluations which attempt to establish a causal relationship between an intervention and observed outcomes without a comparison group.

Designs Examining Change (No Causality)

Pre-Post Designs

- Baseline and endline measure present
- Lacks a counterfactual

Single Time Designs

- No baseline measure (only endline)
- Lacks a counterfactual

Higher internal validity

Lower internal validity

OVERVIEW OF EVALUATION ABSTRACTS FROM ICT4E LANDSCAPE REVIEWS

Evaluation abstracts in this volume are presented in sections linked to four Information and Communications Technologies for Education (ICT4E) Landscape Reviews from which they were extracted. To help readers locate evaluations by the type of education activity or evaluation design involved, the 58 evaluations found in these reviews have been indexed by both topic and evaluation type. Table 1 shows the frequency with which evaluation abstracts describe studies by type of activity and by evaluation design. Table 2 identifies each of these same 58 evaluations by title and sponsoring organization, and provides the page number where it can be located. Table 2 also indicates how each evaluation was coded from a program or topical cluster perspective as well as the evaluation design type cluster into which it fits.

Of these evaluations, 38 percent of studies used “impact evaluation” methods to rigorously examine the degree to which reported outcomes can be attributed to ICT4E interventions. The importance of impact evaluations for advancing learning about “what works” is discussed further in Annex 1, and Annex 2 includes two impact evaluation case studies from among the abstracts included in this volume.

TABLE 1: EVALUATION FREQUENCY BY TOPIC AND DESIGN TYPE IN LANDSCAPE REVIEWS

ICT4E Activity or Outcome Cluster of Interest ¹	Evaluation Design Continuum with Respect to Change and Causality Measurement					Total Number of Evaluations Included by Outcome Cluster
	Descriptive Only	Detects Change	Examines or Formally Tests Causality			
	Single Point in Time ²	Pre-Post of Various Types ³	Non-Experimental Design ⁴	Quasi-Experimental Design ⁵	Experimental Design (RCT) ⁶	
Content Creation	0	1	0	3	0	4
Content Distribution	2	1	0	0	0	3
Teacher Training	2	4	0	3	0	9
Literacy – Child	2	6	0	6	1	15
Numeracy – Child	0	1	2	2	1	6
Parent Engagement	0	0	0	0	0	0
School Administration	1	0	0	0	0	1
Literacy – Adult	0	1	0	1	1	3
Numeracy – Adult	0	0	0	0	0	0
Workforce Development	5	2	3	1	3	14
21 st Century Skills	2	0	1	0	0	3
Total by Design Type	14	16	6	16	6	58

¹ Abstracts in this volume are counted in only one row and one column of this table.

² Single point in time (usually “after only”) studies can accurately measure such things as awareness, access and utilization – overall or separately for different sub-groups – on an “after” basis but cannot determine how much change occurred due to the lack of a baseline.

³ Pre-post studies range from those that describe a current situation and ask for recall data on how things were “before” to formal pre- and post-testing on knowledge, attitudes, skills or practices. They may include sub-group comparisons, e.g., change over time by gender or income level, and can establish associations/correlations.

⁴ Includes a range of designs that examine causality using methods that do not involve a distinct counterfactual, e.g., interrupted time series, General Elimination Method (GEM) or a forensic approach to isolating cause, and contribution analysis. Some but not all case studies may fall in this cluster.

⁵ Includes regression discontinuity as well as matching designs ranging from twin studies to propensity score matching.

⁶ Requires randomized assignment to a group, although the specific means may vary, e.g., computer assignment, lottery.

TABLE 2: INDEX OF EVALUATIONS BY TOPICAL CLUSTER, ORGANIZATIONAL SPONSOR AND DESIGN TYPE

Evaluation Title	Organizational Sponsor	Design Type (EX = experimental)					Page Number in this Volume
		Single Time	Pre- Post	Non- EX	Quasi- EX	EX (RCT)	
Content Creation							
BridgeIT – India	USAID / UNDP				X		11
BridgeIT – Philippines	USAID /UNDP				X		12
BridgeIT – Tanzania	USAID / UNDP				X		12
iCow	USAID		X				23
Content Distribution							
International Children’s Digital Library (ICDL)	University of Maryland	X					33
PAJEF Literacy Classes	UNESCO	X					34
Pride Africa	DrumNet		X				27
Teacher Training							
Aflaa Academy	DfID		X				23
EdQual	DfID	X					30
Learn, Out of the Box	Pratham				X		16
Malawi Teacher Professional Development Support Project	USAID	X					35
m-Ubuntu			X				26
PIEQ (Package for Improving Education Quality)	EDC/USAID		X				27
Re-Kindle-ing Learning	DfID					X	9
Somalia Interactive Radio Instruction Project (SIRIP)	EDC				X		17
Tangerine / Tangerine: Class	RTI International				X		18
Trainer in your pocket	DfID		X				28
Literacy – Child							
“Academy in a Box”	DfID				X		11
Afghan Institute of Learning Mobile Literacy Project	DfID		X				23
Bridges to the Future Initiative (BFI)					X		13
Bunyad Mobile-Based Post-Literacy Program			X				24
Ghana Reads	DfID		X				24
Improviding Literacy in Rural India: Cellphone Games in an After-School Program			X				25
Interactive Radio Instruction (IRI) and Interactive Audio Instruction (Review)	EDC / USAID	X					33
iREAD Ghana	WorldReader				X		14
Mobile and Immersive Learning for Literacy in Emerging Economies (MILLEE)			X				26

Evaluation Title	Organizational Sponsor	Design Type (EX = experimental)					Page Number in this Volume
		Single Time	Pre- Post	Non- EX	Quasi- EX	EX (RCT)	
MobiLiteracy Uganda	USAID				X		15
Open Learning Exchange (OLE) – TeacherMate	Open Learning Exchange				X		15
PlanetRead (Same Language Subtitling)	Planet Read / ACR				X		9
UNESCO Literacy Project	UNESCO		X				28
Yoza Project (formerly m4Lit)	Yoza	X					36
Numeracy – Child							
BottomUp Numeracy Project	BottomUp			X			19
iSchool					X		13
Masamu	EuroTalk					X	8
MoMaths	Nokia		X				25
Play and Learn	Sesame Street Workshop India				X		16
Wits Maths Connect Primary (WMC-P)	University of Witwatersrand, Johannesburg			X			22
Parent Engagement							
None found							
School Administration							
Millenium Villages Project	Millenium Villages Project	X					34
Literacy – Adult							
Jokko Initiative	UNICEF				X		14
Project Alphabeitsation de Base par Cellulaire (Project ABC)	USAID					X	9
Using Mobile Phones to Accelerate Literacy Education and Empower Afghan Women	AIL / USDOS		X				29
Numeracy – Adult							
None found							
Workforce Development							
Avaaj Otalo						X	8
Entra21	IYF			X			19
EQUIP3	USAID/ EDC	X					31
Health Services Support Project (HSSP)	USAID		X				24
Hewlett-Packard Learning Initiative for Entrepreneurs (HP LIFE) Program	Hewlett-Packard	X					32
iHub		X					33
Kenya Nurse Upgrading Program	African Medical and Research Foundation (AMREF)		X				25

Evaluation Title	Organizational Sponsor	Design Type (EX = experimental)					Page Number in this Volume
		Single Time	Pre- Post	Non- EX	Quasi- EX	EX (RCT)	
Obra Initiative	IYF			X			20
PAJE Nièta	USAID / EDC	X					35
Strengthening Health Outcomes through the Private Sector (SHOPS) - Uganda	USAID				X		17
The Somali Shaqodoon Project	USAID / EDC			X			20
Youth Opportunities Program	World Bank					X	10
Youth Opportunities Program II	World Bank					X	10
Youth: Work Jordan	IYF	X					36
21st Century Skills							
BBC Janala (English language)	BBC / DfID	X					30
Kindergarten Mobile Learning Project	SenMobile	X					36
Unlimited potential Community Technical Skills program (review of one program aspect)	Microsoft			X			21

EXPERIMENTAL DESIGNS

Project Title: Avaaj Otalo	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 114
Location: India	Design: Experimental	Project URL: http://www.hbs.edu/faculty/Publication%20Files/13-047_08f3cd3a-dfb4-482e-af80-f53b20f1ad46.pdf	
	Outcome Cluster: Workforce Development		
Evaluation Abstract: This study is a randomized evaluation of the introduction of a mobile-phone based agricultural consulting service, “avaaj otalo” (ao), to cotton farmers in Gujarat, India. This paper explores the possibility of improving agricultural management and reducing barriers to technology adoption resulting from “informational inefficiencies” by delivering customized, timely advice via mobile phone. It evaluates avaaj otalo (ao), a mobile phone-based technology that allows farmers to call a hotline, ask questions, and receive responses from agricultural scientists and local extension workers.			

Project Title: Masamu	Source: Mobile Education for Numeracy (GIZ)		Source Document Page Number : 15
Location: Malawi	Design: Experimental	Study URL: https://onebillion.org/downloads/unlocking-talent-final-report.pdf	
	Outcome Cluster: Numeracy - Child		
Evaluation Abstract: This study evaluated the tablet-based Masamu intervention, developed by EuroTalk, in supporting the acquisition of mathematical abilities in primary school children in Malawi. A Randomized Control Trial (RCT) was conducted in a medium-sized primary school in Lilongwe in which 400 children from Standard 1-4 were randomized to one of three intervention groups: a tablet-based Masamu intervention group, a tablet-based Non-Masamu control group, and a normal-practice control group. Children were pre-tested using tablets at the start of the school year on two tests of mathematical knowledge and a range of basic skills related to scholastic progression. Ambitions and attitudes towards learning were also measured. The intervention was then delivered over an 8week period, for the equivalent of 30 minutes per day, by classroom teachers at the school, with technical support from VSO. Children were then post-tested on the same assessments as given at pre-test. A matched sample of 283 children, from Standard 1-3, was analyzed to investigate the effectiveness of the tablet-based Masamu intervention. Results showed significant effects of the tablet based Masamu intervention over and above normal classroom practice or using tablets without the Masamu software. In general, children that had received the tablet based Masamu intervention made significantly greater gains in mathematical ability over the 8-week intervention period than both groups of controls. Furthermore, the greater learning gains shown by the Masamu intervention group compared to the control groups on the tablet assessments transferred to paper and pencil format, illustrating that the mathematical knowledge acquired through using tablets generalizes to different contexts.			

Project Title: PlanetRead	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 105
Location: India	Design: Experimental	Study URL: http://www.planetread.org/pdf/SLS-Effects-on-Literacy.pdf	
	Outcome Cluster: Literacy - Child		
Evaluation Abstract (updated by team): Research conducted at the Indian Institute of Management, Ahmedabad found that SLS improves reading ability by strengthening decoding capacity and habituating fluidity. SLS exposure was found to raise the rate of newspaper reading among “literate” youth from 34 percent to 70 percent (PlanetRead, 2012, p. 6). An adapted SLS project was evaluated using a quasi-experimental design in 2013 which also suggested positive results.			

Project Title: Project Alphabétisation de Base par Cellulaire (ABC)	Source: Mobiles for Reading Landscape (USAID) Mobiles for Youth Workforce Development		Source Document Page Number : 51-52 120
Location: Niger	Design: Experimental	Study URL: http://www.ingentaconnect.com/content/aea/aeja/2012/00000004/00000004/art00004	
	Outcome Cluster: Literacy-Adult		
Evaluation Abstract: The returns to educational investments hinge on whether such investments can improve the quality and persistence of educational gains. We report the results from a randomized evaluation of an adult education program in Niger, in which some students learned how to use simple mobile phones (Project ABC). Students in ABC villages achieved test scores that were .19-.26 standard deviations higher than those in standard adult education classes, and standardized math test scores remained higher seven months after the end of classes. These results suggest that simple information technology can be harnessed to improve educational outcomes among rural populations.			

Project Title: Re-Kindle-ing Literacy	Source: Educational Technology Topic Guide (DFID)		Source Document Page Number : 30
Location: Nigeria	Design: Experimental	Study URL: Not Available	
	Outcome Cluster: Teacher Training		
Evaluation Abstract (from HEART paper): 500 randomly selected Grade 8 students (13 years) were assigned to either no change, the library, the library and curriculum or the library, curriculum and supplementary. In six months it showed that most had no obstacles and it could help motivate pupils as well as improve their aspirations. This is useful but content is key as well as student interest/effort. The results are promising and prices are low. There are opportunities for student-centered learning approaches, teaching what the system can't or won't, impacting student effort/aspirations and possibilities for remedial instruction. There is still a need to test variety of content, diagnostics and feedback.			

Project Title: Youth Opportunities Program	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 126
Location: Uganda	Design: Experimental	Study URL: https://www.poverty-action.org/sites/default/files/blattmanfialamartinez_midtermreport.pdf	
	Outcome Cluster: Workforce Development		
Evaluation Abstract: Can cash transfers promote employment and reduce poverty in rural Africa? Will lower youth unemployment and poverty reduce the risk of social instability? We experimentally evaluate one of Uganda’s largest development programs, which provided thousands of young people nearly unconditional, unsupervised cash transfers to pay for vocational training, tools, and business start-up costs.			

Project Title: Youth Opportunities Program II	Source: Mobiles for Youth Workforce Development	Source Document Page Number : 127
Location: Uganda	Design: Experimental	Study URL: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2268552
	Outcome Cluster: Workforce Development	
Evaluation Abstract: We study a government program in Uganda designed to help the poor and unemployed become self-employed artisans, increase incomes, and thus promote social stability. Young adults in Uganda's conflict-affected north were invited to form groups and submit grant proposals for vocational training and business start-up. Funding was randomly assigned among screened and eligible groups. Treatment groups received unsupervised grants of \$382 per member. Grant recipients invest some in skills training but most in tools and materials. After four years half practice a skilled trade. Relative to the control group, the program increases business assets by 57%, work hours by 17%, and earnings by 38%. Many also formalize their enterprises and hire labor. We see no impact, however, on social cohesion, anti-social behavior, or protest. Impacts are similar by gender, but are qualitatively different for women because they begin poorer (meaning the impact is larger relative to their starting point) and because women's work and earnings stagnate without the program but take off with it. The patterns we observe are consistent with credit-constraints.		

QUASI-EXPERIMENTAL DESIGNS

Project Title: Academy in a Box	Source: Educational Technology Topic Guide (DFID)		Source Document Page Number : 63
Location: Kenya	Design: Quasi-Experimental	Study URL: http://www.bridgeinternationalacademies.com/wp-content/uploads/2013/01/Bridge-International-Academies_White-Paper_The-Bridge-Effect_Nov-2014_Website.pdf	
	Outcome Cluster: Literacy-Child		
Evaluation Abstract: Bridge’s EGRA/EGMA programme includes a multi-year, pupil-matched study. Working in partnership with a third-party company, each pupil is given a 30-minute, one-on-one oral assessment upon entry into the study by a trained external assessor. The study then aims to track the same pupils over time and measures their annual performance at each of the participating schools. There are three cohorts of pupils; the first cohort was first assessed in July 2011 in the greater Nairobi area; the second cohort was first assessed in February 2012 in four major urban areas across Kenya (Nairobi, Nakuru, Eldoret, and Kisumu); and the third and latest cohort was first assessed in October 2013 and is a nationally representative sample.			

Project Title: BridgeIT	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 63
Location: Tanzania	Design: Quasi-Experimental	Study URL: http://www.iyfnet.org/sites/default/files/BridgelT_Eval_Exec_Summary_Jul2011.pdf	
	Outcome Cluster: Content Creation		
Evaluation Abstract: This evaluation used math and science tests in conjunction with attitude questionnaires and classroom observation to measure learning gains, teacher classroom performance and attitude changes for both teachers and students. Data were collected from a total of 18 Bridge IT schools and 18 control schools. The sample size (# of students) was sufficient for the evaluator to make valid statistical comparisons between students' performance in math and science in BridgelT classrooms with those who were not exposed to the approach; however, the sample size was not large enough to make comparisons in overall school performance.			

Project Title: BridgelT	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 124
Location: India	Design: Quasi-Experimental	Study URL: http://www.educationinnovations.org/sites/default/files/BridgelT%20India%20Endline%20Report%202011-12.pdf	
	Outcome Cluster: Content Creation		
Evaluation Abstract: Evaluations of similar programs in Tanzania and Philippines proved that the use of NED in the classroom can improve student engagement, attendance, and academic performance. Ultimately, a comparison between pre-treatment and post-treatment teachers and students should answer the questions related to this intervention.			

Project Title: BridgelT	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 124
Location: Philippines	Design: Quasi-Experimental	Study URL: http://pdf.usaid.gov/pdf_docs/PDACK830.pdf	
	Outcome Cluster: Content Creation		
Evaluation Abstract: We adopted a quasi-experimental design with a pre- and post-test administered to selected study schools in the text2teach project area and a comparable set of control schools in the same provinces. We picked a 10 percent sample of the ELSA text2teach schools (12 out of 122 schools) and matched each chosen sample with a control school. Matching criteria were accessibility for testing, relative proximity to the counterpart study school and enrolment size. The 12 schools were distributed across province proportional to number of text2teach schools by province. Thus we had 5 schools from Maguindanao, 4 from Cotabato and 3 from South Cotabato with matching controls for a total of 24 schools			

Project Title: Bridges to the Future Initiative (BFI)	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 61
Location: India (later South Africa)	Design: Quasi-Experimental	Study URL: http://www.literacy.org/sites/literacy.org/files/publications/wagner_ict_lit_india_itid_dec10_bw.pdf	
	Outcome Cluster: Literacy-Child		
Evaluation Abstract: Two studies were undertaken in Andhra Pradesh state. One included a sample of youth and young adults who had never gone to school (or dropped out early) in peri-urban Hyderabad, and the other was composed of young second- and third-grade school children in rural West Godavari district. Based on a short-term intervention program, research results demonstrated a modest positive impact on the learning rate in reading with both groups of learners (when compared with control groups without the multimedia intervention). The findings provide support for the view that information and communications technologies for development can assist in promoting literacy among the poorest of the poor. In addition, the present results support the view that the digital divide, as it evolves over time, will only be narrowed when content-based solutions are sensitive to, and built on cultural and linguistic diversity.			

Project Title: iSchool	Source: Mobile Education for Numeracy (GIZ)		Page Number: 14
Location: Zambia	Design: Quasi-Experimental	Study URL: http://ischool.zm	
	Outcome Cluster: Numeracy - Child		
Evaluation Abstract: Monitoring and evaluation is conducted twice a year in 5 control schools and 5 pilot schools with over 3 000 students. USAID’s EGRA (Early Grade Reading Assessment) and EGMA (Early Grade Maths Assessment) are used alongside a critical thinking tool that iSchool developed and tested with the help of the University of Zambia and Cambridge University. There is an internal M&E team with external evaluators from Universities of Alberta and Cambridge.			

Project Title: Jokko Initiative	Source: Mobiles for Reading Landscape (USAID) Mobiles for Youth Workforce Development		Source Document Page Number : 81-82 115
Location: Senegal	Design: Quasi-Experimental	Study URL: https://escholarship.org/uc/item/1c31c2m4	
	Outcome Cluster: Literacy - Adult		
Evaluation Abstract: The first phase of the literacy and numeracy module took place from March through June 2009. In late 2009, Tostan added a 150-hour cell-phone module to the literacy course, which it ran into 2010. As part of this module, Tostan provided 15 practice phones in each of the 200 villages. A Community Forum was added, allowing a community member to disseminate information to a network of peers by sending a single text message. The goal of this intervention was to increase the use of text messaging and reinforcing new skills in literacy and numeracy. Fifteen villages were selected to pilot the SMS Community Forum. During the class period, the SMS Community Forum was free to use, and cost the price of a message after that date.			

Project Title: iREAD Ghana	Source: Mobiles for Reading Landscape (USAID) Mobiles for Youth Workforce Development		Source Document Page Number : 132-133 112
Location: Ghana	Design: Quasi-Experimental	Study URL: http://pdf.usaid.gov/pdf_docs/pnadz402.pdf	
	Outcome Cluster: Literacy - Child		
Evaluation Abstract: A study was conducted by a third party (ILC Africa) during the 2010/2011 school year in nine selected schools in Ghana on the use of e-readers. The study was conducted on "a purposive sample of 481 students in nine project-affected schools in the communities of Suhum District, Kade, and Adeiso" (Worldreader, 2012, p. 5). The study found an increased enthusiasm of students towards reading (judged by interviews, books accessed, attendance at voluntary events and case studies) as well as a boost in regular access to reading materials. There was an incremental increase in reading ability for primary level students for those with e-readers vs. those without, based on standardized test results (primary levels only; non-significant differences at junior and senior high levels). A cost/benefit analysis was conducted comparing e-reader vs. traditional paper textbook system over the course of four years of primary and junior high school. The outright cost of e-readers was only 8 to \$11 more per student (assuming the breakage rate significantly improved) while benefits and access to books was "much greater" (Worldreader, 2012, p. 47). There were also weaknesses in the study design in the project report: the sample was not geographically representative of Ghanaian students; self-reported student reading logs may not have been reliable; and 40.5 percent of devices broke and needed to be replaced during the one school year trial study.			

Project Title: MobiLiteracy Uganda	Source: Mobiles for Reading Landscape (USAID)	Source Document Page Number : 87
Location: Uganda	Design: Quasi-Experimental	Study URL: https://dl.dropboxusercontent.com/u/31968186/Mobiliteracy_Endline_Report_final_Rev_SUBMTITED_Jan%206%202014.pdf
	Outcome Cluster: Literacy- Child	
Evaluation Abstract: Implementation involved an experimental research design in which three separate groups of parents and their Primary 1 (P1, or Grade 1) or Primary 2 (P2, or Grade 2) children were randomly assigned to one of the following groups: Group A Mobile phone content: Provided with a mobile phone and the MLIT 91- day SMS + audio product delivered to the phone daily. Group B Paper-based content: Provided with a paper-based version of MLIT, which is a printout of all of the audio and text messages delivered to Group A Group C Control group receiving one-time verbal literacy message: Not provided with any literacy materials or support. At the time of assignment into the different groups, provided with a brief, one-time verbal message to support children's literacy (i.e., talking to children daily about school, letters of the alphabet, letter sounds, etc.). The endline sample consisted of 94% of the people who signed up and were interviewed or assessed at baseline, or close to 50 parents and 50 students in each research group.		

Project Title: Open Learning Exchange (OLE) – TeacherMate	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 95
Location: Rwanda and Ghana	Design: Quasi-Experimental	Study URL: http://www.heart-resources.org/doc_lib/rwanda-teachermate-report/	
	Outcome Cluster: Literacy - Child		
Evaluation Abstract: An evaluation of the Rwanda pilot was conducted in 2011. Students’ English literacy skills were evaluated at the beginning (January) and the end (October) of the school year using a test adapted from the EGRA. Results showed an average increase of 36 percent among standardized measures of verbal skills for the students using the TeacherMate system, compared with an average increase of 14 percent in each of the two control groups (Mruz, 2011, p. 12). The pilot found that the actual usage of the TeacherMate system was only used at one-third of the recommended capacity within the classroom. This was a result of large class sizes, management issues with distribution and collection of the TeacherMates, and low attendance rates due to disruptions within the school and academic calendar. Several localization challenges were noted because the TeacherMate system was a software tool adapted from a program originally designed for classrooms in the U.S. Some vocabulary and storylines used were not appropriate for the Rwandan context. Additionally, the curriculum was not aligned with the Rwandan curriculum, which caused competition for time between government standards and test material and the implementation of the TeacherMate system (Mruz, 2011).			

Project Title: Pratham – Learn, Out of the Box	Source: Mobiles for Reading Landscape (USAID)	Source Document Page Number : 107-108
Location: India	Design: Quasi-Experimental	Study URL: http://www.educationinnovations.org/program/pratham-learn-out-box
	Outcome Cluster: Teacher Training	
Evaluation Abstract: Catalyst Management Services (CMS) a third party Monitoring-and-Evaluation agency carried out a prototype evaluation in 10 schools from Mumbai and Mysore with focus groups and one-on-one interviews. (Pratham, 2013). To date, qualitative results suggest that both students and teachers felt more motivated to learn using the WebBox.		

Project Title: Play 'n Learn	Source: Mobile Education for Numeracy (GIZ)		Source Document Page Number :13
Location: India	Design: Quasi-Experimental	Study URL: https://www.qualcomm.com/company/wireless-reach/projects/india-play-n-learn	
	Outcome Cluster: Numeracy - Child		
Evaluation Abstract: The study was conducted by two different research agencies: for the in-community intervention, Policy Innovations conducted the study and for the in-classroom it was done by New Concept. A quasi-experimental study using a non-randomized control group pre-test/post-test design in which participants of the study were chosen from areas recommended by the SWI team. The study applied a pre- and post-intervention design using control and intervention groups. Quantitative and qualitative methods were used for data collection at endline and baseline which included teacher's interviews, children's focus group discussions and measures of children's Hindi and Mathematics skills as well as classroom observations to document and track the impacts of teaching and learning practices. Monthly data from application usage tracker was used to understand which games were played the most (duration and frequency). Teams from SWI visited the schools and slum communities monthly to get feedback on the games, and help the teachers with any challenges/issue			

Project Title: Strengthening Health Outcomes through the Private Sector (SHOPS)	Source: Mobiles for Youth Workforce Development	Source Document Page Number :118
Location: Uganda	Design: Quasi-Experimental	Study URL: http://www.shopsproject.org/sites/default/files/resources/SHOPS%20m4QI%20Uganda%20Pilot%20Report.pdf
	Outcome Cluster: Workforce Development	
Evaluation Abstract: This project aimed to reinforce face-to-face induction lessons, improving behavioral changes in service delivery. This pilot developed a technology-supported approach to performance improvement by creating a platform to manage and automate delivery of text message reminders and quizzes to address identified gaps in knowledge and practice. This system was also used to identify actionable topics for supervisor follow-ups. The SMS system was designed specifically for low-end phones and participants with limited or no Internet access. The pilot promoted team learning and research on questions related to the SMS messages, and an increased use of training reference materials and clinical guideline documents. The pilot also intended to orient participants through face-to-face sessions with Center and Outreach Team managers in order to cascade this service throughout staff members. However, this was not implemented due to scheduling changes.		

Project Title: Somalia Interactive Radio Instruction Project (SIRIP)	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 119
Location: Somalia	Design: Quasi-Experimental	Study URL: http://idd.edc.org/sites/idd.edc.org/files/EDC%20Education%20in%20Fragility%20Series-Somalia%20Shaqodoon.pdf	
	Outcome Cluster: Teacher Training		
Evaluation Abstract: The grade one IRI evaluation was conducted in 2006/2007 by EDC. The grade one treatment group scored 15 percent higher in literacy and 20 percent higher in math than non-treatment peers (Letshabo, Kariuki & Yasin, 2007). A mid-term evaluation was conducted in 2010 by JBS International. Older learners returning to school after experiencing disruptions in their learning due to internal conflict and political instability showed learning gains of 21 percent compared to 8 percent for non-treatment peers (JBS International, 2010).Based on 32 classroom observations, the study concluded that “most teachers in formal primary schools and Learning Centers are able to manage SIRIP classes well when the programs are clearly audible, ... and teachers find that students enjoy and engage with the SIRIP programs and learn from them at an accelerated rate compared to similar students in years before SIRIP was available.” (JBS International, 2010, p. ii).			

Project Title: Tangerine / Tangerine: Class	Source: Mobile Education for Numeracy (GIZ) Mobiles for Reading Landscape (USAID)		Source Document Page Number : 23 124
Location: Kenya	Design: Quasi-Experimental	Study URL: http://www.tangerinecentral.org/sites/default/files/Field_trial_summary_v3_FINAL.pdf	
	Outcome Cluster: Teacher Training		
Evaluation Abstract: Internal and external alpha testing of the software was completed in October 2011 to ensure basic functionality, but it was important to conduct more thorough field testing before using the software for large-scale data collection in case contextual factors, such as user expectations, environmental conditions, or scale of use (i.e., number of consecutive tests conducted and overall size of the database), would uncover any unanticipated requirements that would necessitate modification of the design. In January 2012, the Primary Math and Reading (PRIMR) Program, a 3-year US Agency for International Development-funded EdData II project, implemented by RTI International, provided a site for a small-scale data collection trial using Tangerine. This field trial was intended for a first-level analysis of hardware and software performance, usability, and the overall feasibility of the approach based on actual conditions of administration. It involved a small sample in an urban area of Kenya consisting of 200 children in 10 schools, each completing three assessments (English EGRA, Kiswahili EGRA, EGMA), for a total of 600 assessments and more than 176,000 individual data points captured. Six enumerators visited schools in two teams of three enumerators each—one school per day, testing 10 students from first grade and 10 from second grade. The key research questions that the field trial aimed to answer were focused on the following: •Functionality of hardware and software: Does the electronic approach allow for complete and accurate recording of student responses? Does the electronic approach offer a secure method of backing up and transferring data for analysis? Is the hardware appropriate for typical assessment conditions? •Usability: Have we achieved a user-centered design, from the perspective of typical end users, for Tangerine? Does the user interface of the selected hardware model create any barrier to use? •Comparison of electronic vs. paper assessments: To what extent is electronic administration as reliable as the paper administration? What other added value can be achieved through the use of the electronic mode?			

NON-EXPERIMENTAL DESIGNS

Project Title: Bottomup	Source: Mobile Education for Numeracy (GIZ)	Source Document Page Number : 31
Location: South Africa	Design: Non-Experimental	Study URL: http://www.bottomup.org.za/numeracy-project-report-1st-term/
	Outcome Cluster: Numeracy - Child	
Evaluation Abstract: Our Grade 3 Cohort (44 learners) have been using 10monkeys.com (Finland) and are now solving an average of 2342 problems per session (about 53 problems per learner in a 35 minute session) with an accuracy of 76 %. What makes 10monkeys.com great is that it uses the cloud to track learner reports, making it accessible anywhere, anytime. This allows Bottomup coaches to detect which learners are struggling and give those learners a one-on-one “micro-lesson” while the rest of the class continues practicing. The Grade 5 (80 learners) & 6 (47 learners) Cohort are using the KhanAcademy.org platform which is also an excellent tool although more suited to intermediate phase and older learners. We have seen interesting results on Khan Academy which has demonstrated to us the variance the ability of each learner in a class and the great need for individualized education. Some learners who may be held back by the pace of the class are skyrocketing forward on Khan Academy and attempting work which is well ahead of their grade-level. Many learners who are struggling are able to go back and master skills which they have battled with in the classroom. The individualized learning that takes place in these sessions (as well as 10monkeys.com) would simply be impossible to re-create without the use of technology. The teacher becomes a coach who helps learners as problems arise rather than offering general lectures to a whole class.		

Project Title: Entra21	Source: Mobiles for Youth Workforce Development	Source Document Page Number : 110
Location: Latin America	Design: Non-Experimental	Study URL: http://www.iyfnet.org/sites/default/files/entra21_Learning_7_ExecSum.pdf
	Outcome Cluster: Workforce Child	
Evaluation Abstract: Launched in 2001 by IYF in collaboration with the Multilateral Investment Fund of the Inter-American Development Bank, to improve the employability of disadvantaged youth in Latin America and the Caribbean with market-relevant training or to create decent work opportunities. Phase I included a comprehensive set of training and job placement activities. A second phase was launched in 2007, to benefit youth at higher risk from being un- or under-employed due to factors such as being rural based, disabled, or associated with violence. Phase II worked to scale up best practices validated in Phase I Of the 14 projects in Phase II, five were selected to be part of a study that examined the effectiveness of entra21 in helping these youth gain market-relevant job skills and become employed. Conducted over two and one-half years, the study included two site visits to each project and extensive consultations with each project team via email, webinars, and other forms of communication. During the site visits, the researcher conducted focus groups with staff and youth, interviewed key informants, and observed training sessions. To the extent possible, the researcher also engaged project leaders in the research process, tapping their knowledge to document which technologies were being used and how, and engaging them in the interpretation of the findings.		

Project Title: Obra Initiative	Source: Mobiles for Youth Workforce Development	Source Document Page Number : 114
Location: Jamaica	Design: Non-Experimental	Study URL: http://library.iyfnet.org/sites/default/files/library/ObraGlobalReportENG.pdf
	Outcome Cluster: Workforce Development	
Evaluation Abstract: From 2009 to 2011, Obra, a USD \$2 million initiative operated with support from USAID, worked to ensure youth at risk in the LAC region have improved access to the programs and services needed to prepare them for citizenship, work, and life. Building on foundational IYF programs such as Entra 21, Obra generated concrete opportunities for youth at risk, developed mechanisms for identifying and sharing best practices, and applied these practices in specific education and employability projects through the creation of multi-sector alliances. Obra brought together public, private, and non-profit partners in the sub-regions to leverage resources and disseminate best practices across the LAC region. Obra leveraged technology and social media to engage youth, promote the alliance, recognize partners, and advocate for youth. Using the strength of the alliance, Obra tapped into the communication strategies of their partners, building the technological and social media capabilities of partners throughout the region. Facebook, YouTube, and the Obra website were used to share good practices and exchange information on youth programs		

Project Title: The Somali Shaqodoon Project	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 111
Location: Somalia	Design: Non-Experimental	Study URL: http://pdf.usaid.gov/pdf_docs/pdocyl27.pdf	
	Outcome Cluster: Workforce Development		
Evaluation Abstract: The Shaqodoon program focused on increasing the access Somali youth have to training, internships, entrepreneur, and employment opportunities. There are several ways mobile technologies were employed in this program: The InfoMatch service provided by Shaqodoon gives youth up-to-date information on opportunities such as jobs, internships, and short courses posted by potential employers. Youth enroll themselves and create mini-CVs through the application. They can then search posted opportunities using their cell phones and be matched with an opportunity by SMS, online or by calling a toll-free number to an automated opportunity match service. Employers can search the database for a potential employee with the right set of skills for a job. Shaqodoon’s Survey module allows schools, universities, businesses, and NGOs to send SMS surveys to trainees, program beneficiaries, and customers. These short questionnaires allow service subscribers to get key information about their constituents, particularly when they are unreachable in person. Questions are answered via SMS and answers are also fed into a web interface. Similarly, Shaqodoon provides an SMS alert system to allow quick and efficient communication with beneficiaries. Voice Alerts can be used as well, which enables non-literate beneficiaries to engage in alerts. This service can reach up to 60 registered numbers with a one-minute audio file every minute, a delivery rate of 3,600 per hour. The Interactive Audio Instruction (IAI) uses MP3 devices to deliver lessons via audio programs. Facilitators also used Shaqodoon’s cellular services to lead discussions based on these daily lessons. Topics of these lessons were focused on financial literacy and entrepreneurship.			

Project Title: Unlimited Potential Community Technology Skills Program	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 128
Location: Brazil, Ecuador, Guatemala, Mexico, Venezuela	Design: Non-Experimental	Study URL: http://tascha.uw.edu/publications/technology-for-employability-in-latin-america-research-with-at-risk-youth-and-people-with-disabilities/	
	Outcome Cluster: 21 st Century Skills		
Evaluation Abstract: The study reviews programs that provide basic computer training for people with disabilities and at-risk youth. Based on primary research in five countries—Brazil, Ecuador, Guatemala, Mexico, and Venezuela—it discuss the landscape of issues around technology and employability and investigate how ICT training impacts the employability concerns of two populations with diverse needs and histories of social and economic exclusion. Findings are broadly divided into three segments: (a) the environmental factors that impact such projects, including the aspirational environment and the discourse of technology; (b) the short-term impacts of these programs, including the creation of pathways to employment and community-building, the impacts on self-esteem and stigmatization, and the potential of mismatched employment expectations resulting from access to these programs; and (c) factors that influence the success of such programs including cost, certification, and accessible technology.			

Project Title: Wits Maths Connect Primary	Source: Mobile Education for Numeracy (GIZ)		Source Document Page Number : 33
Location: South Africa	Design: Non-Experimental	Study URL: http://www.wits.ac.za/academic/humanities/education/research/wmc/witsmathsconnectprimary/21436/research.html	
	Outcome Cluster: Numeracy - Child		
Evaluation Abstract: National and international evaluations of numeracy knowledge have shown that numeracy levels in South Africa are below the competencies specified in the curriculum. Within the broader context of ongoing poor performance in numeracy, a longitudinal research and development project – the Wits Maths Connect – Primary project (WMC–P) has been launched aimed at improving the teaching and learning of primary mathematics. As part of the baseline data collected for this project, the project team observed and videotaped a single numeracy lesson across the Grade 2 classes in the ten project schools, with a view to gaining insights about the nature of teaching and learning, and the classroom contexts of these activities. The analysis has been framed by the Systemic Functional Linguistics concept of coherence and the Variation Theory concept of structured variation. This paper presents evidence to illustrate, firstly, poor coherence in and across pedagogic communication and activities and secondly, random selection and sequencing of exercises that militate against meaning making. The ambiguous use of co-references, co-classifications and co-extensions coupled with random selection and sequencing of tasks give rise to weak coherence within practices that exhibit “extreme localization” and ‘ahistoricity’. Such practices work to severely impair possibilities for connected learning of number concepts			

PRE-POST DESIGNS

Project Title: Afghan Institute of Learning Mobile Literacy Project	Source: Educational Technology Topic Guide (DFID)	Source Document Page Number : 28
Location: Afghanistan	Design: Pre-Post	Study URL: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/ICT/pdf/Yacoobi.pdf
	Outcome Cluster: Literacy – Child	
Evaluation Abstract (from HEART paper): The Afghan Institute of Learning (AIL) implemented the Mobile Literacy programme, which involved mobile phones being used to promote basic literacy among women in rural Afghanistan. The programme supplemented AIL’s classroom literacy sessions with instruction delivered via text messaging. Fifty students were selected from two of AIL’s Learning Centres in rural Afghanistan. Each student received a handset (that ran on the standard 2G system), a phone card, and a notebook. Teachers sent daily texts to the students, who read the incoming message and responded via return text message -demonstrating reading comprehension and writing skills. Students attended twice-monthly evaluation sessions to monitor progress and receive assistance, in addition to attending classes.		

Project Title: Aflaa Academy	Source: Educational Technology Topic Guide (DFID)	Source Document Page Number : 25
Location: Rwanda	Design: Pre-Post	Study URL: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/ICT/pdf/Yacoobi.pdf
	Outcome Cluster: Teacher Training	
Evaluation Abstract (from HEART paper): This is a pilot of the Aflatoun programme in Rwanda. The project plans to share a globally proven model of providing practical training on child-centered learning with teacher training colleges in Rwanda that support the development of financial and social skills. The training is using child social and financial education open source materials. It will use teaching methods to ensure that teaching quality improves, and that teachers are equipped to deliver a proven curriculum to ensure that children's financial capability and life skills are enhanced. The primary outcomes that will be measured are the teaching methods used by the teachers and the learning and behavioural outcomes of a random subsample of their students (15 per teacher) after training. Teaching methods will be measured through class visits using the PREQUIP observational checklist. Academic outcomes will be measured using the data from EMIS and the student surveys. A random sample of 15 students in each of these teachers' classes will be surveyed using the Aflatoun Student Survey in order determine if the programme improves self-efficacy, social skills, savings, budgeting and entrepreneurship (behaviour, attitudes and knowledge). If possible the data will be collected at baseline, 6 months, 12 months		

Project Title: Bunad Mobile-Based Post-Literacy Program	Source: Mobiles for Reading Landscape (USAID)	Source Document Page Number : 69
Location: Pakistan	Design: Pre-Post	Study URL: http://www.bunad.org.pk/Mobile%20Based%20Literacy.htm
	Outcome Cluster: Literacy – Child	
Evaluation Abstract: No comprehensive evaluation is available. However, it was reported that 87 percent of the targeted learners (250 learners) were satisfied with their learning after the first the pilot phase of the project in 2009 (Malik, 2012, p. 5). During May-October 2010, the project reported that 1,250 learners from 50 centers became “literate” (e.g. able to read newspapers, solve simple calculation problems involving small amounts of money, read Urdu translations of the Quran, etc.). The parents of female children were also reported to express motivation to send their daughters to schools (Malik, 2012, p. 5). The evaluation results were not supported by detailed analysis of data that were collected.		

Project Title: Ghana Reads	Source: Educational Technology Topic Guide (DFID)		Source Document Page Number : 18
Location: Ghana	Design: Pre-Post	Study URL: http://doc.oleghana.org/_//Ghana%20Reads%20Midterm%20Evaluation%20%281%29.pdf	
	Outcome Cluster: Literacy – Child		
Evaluation Abstract: HSSP has incorporated systematic SMS messaging into its training protocol. These messages reinforce lessons learned and best practices for training, remind participants to implement their action plans, and allow them to practice newly acquired skills. They also provide health tips related to trainings and provide a call to action. HSSP used a post-training follow up system to ensure that participants are utilizing their new skills. As part of this process, information was collected about the SMS protocol to determine its effectiveness.			

Project Title: Health Services Support Project (HSSP)	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 116
Location: Afghanistan	Design: Pre-Post	Study URL: http://pdf.usaid.gov/pdf_docs/PDACT377.pdf	
	Outcome Cluster: Workforce Development		
Evaluation Abstract: HSSP has incorporated systematic SMS messaging into its training protocol. These messages reinforce lessons learned and best practices for training, remind participants to implement their action plans, and allow them to practice newly acquired skills. They also provide health tips related to trainings and provide a call to action. HSSP used a post-training follow up system to ensure that participants are utilizing their new skills. As part of this process, information was collected about the SMS protocol to determine its effectiveness.			

Project Title: Improving Literacy in Rural India: Cellphone Games in an after-school program	Source: Mobiles for Youth Workforce Development	Source Document Page Number : 132
Location: India	Design: Pre-Post	Study URL: http://www.cs.cmu.edu/~mattkam/publications/CTD2009.pdf
	Outcome Cluster: Literacy – Child	
Evaluation Abstract: Literacy is one of the great challenges in the developing world. But universal education is an unattainable dream for those children who lack access to quality educational resources such as well-prepared teachers and schools. Worse, many of them do not attend school regularly due to their need to work for the family in the agricultural fields or households. This work commitment puts formal education far out of their reach. On the other hand, educational games on cellphones hold the promise of making learning more accessible and enjoyable. In our project's 4th year, we reached a stage where we could implement a semester-long pilot on cellphone-based learning. The pilot study took the form of an after-school program in a village in India. This paper reports on this summative learning assessment. While we found learning benefits across the board, it seemed that more of the gains accrued to those children who were better equipped to take advantage of this opportunity. We conclude with future directions for designing educational games that target less well-prepared children in developing regions.		

Project Title: iCow	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 100
Location: Kenya	Design: Pre-Post	Study URL: http://icow.co.ke/index.php?option=com_k2&view=item&id=15:icow-impact-study-results&Itemid=13	
	Outcome Cluster: Content Creation		
Evaluation Abstract: iCow is a mobile application designed to help farmers improve their productivity. The application allows farmers to track milking schedules, estrus cycles, nutrition, and other vital information from each cow. The application also provides information on animal health care, feed production, milk production, and nutrition. The application is customizable allowing farmers to create individual gestation calendars, milking schedules, immunization schedules, diet information, cost of production, and calf records. They also receive tailored, timely information to their mobile devices to help in their production. Farmers can access this information from their mobile phones or online.			

Project Title: Kenya Nurse Upgrading Program	Source: Mobiles for Youth Workforce Development	Source Document Page Number : 123
Location: Kenya	Design: Pre-Post	Study URL: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3589248/
	Outcome Cluster: Workforce Development	
Evaluation Abstract: The report assesses how effectively learners apply what they have learned through the blended learning courses. The evaluation set out to: Assess if nurses, both current eLearners and graduates, are transferring the newly acquired skills, knowledge, and attitudes to their everyday work arena Assess if there was significant and measurable change in performance of the graduates when they get back to their jobs Determine if there were any barriers (e.g., managerial, organizational, incentives) that prevent the students from applying part or all of what they are learning to their jobs The study was conducted with 205 nurse graduates (73%) and learners (27%), and their supervisors. Qualitative and quantitative data were collected.		

Project Title: MoMaths	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 89
Location: South Africa	Design: Pre-Post	Study URL: http://www.un.org/en/ecosoc/innovfair2011/docs/nokia.pdf	
	Outcome Cluster: Numeracy - Child		
Evaluation Abstract: According to Nokia (2013), MoMath “has reached 150 schools with around 14,000 students actively using the service. Those students have completed more than four million exercises to date. Of those registered learners, 53 percent became active MoMaths users, with 69 percent of teachers actively using the solution.” An internal study in 2010 on the first 24 weeks of the intervention in Grade 10 public schools showed that students who used MoMaths regularly (completing more than 15 practice exercises and tests) received grades 7 percent higher than their peers who did not use the service on a regular basis (United Nations, 2012).			

Project Title: Mobile and Immersive Learning for Literacy in Emerging Economies (MILLEE)	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 85
Location: India (other related projects in Sub-Saharan Africa and China)	Design: Pre-Post	Study URL: http://www.cs.cmu.edu/~mattkam/lab/millee.html	
	Outcome Cluster: Literacy - Child		
Evaluation Abstract: A series of field studies were conducted between July 2004 and January 2007 with children from the urban slums and rural areas of India (Kam, Ramchandran, & Canny, 2006). The pre- and post-tests administered for the above games show statistically significant gains on small samples. Studies of an after-school program in Uttar Pradesh, India that utilized MILLEE games to assist English instruction showed significant post-test gains after the intervention (Human Development Lab Carnegie Mellon University, n.d.).Kam et al. (2009) reported that the learners with higher initial game test scores improved their scores more than those with lower initial test scores. Conversely, learners with the greatest need for ESL instruction benefited less. Such information concerning stratified differences is useful and uncommon.			

Project Title: M-Ubuntu	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 83
Location: South Africa	Design: Pre-Post	Study URL: Unavailable	
	Outcome Cluster: Teacher Training		
Evaluation Abstract: No external evaluation has been completed. However, a small evaluation was undertaken for the MacArthur-funded pilot program in 2010. Findings focused on teacher attitudes and behaviors and did not measure children’s literacy outcomes. Comparing pre-test and post-test survey results from participating teachers showed an increase in positive attitudes about the potential of technology to transform teaching and learning in post-test findings, and an increase in desire for additional training in technology. Teachers also indicated that the choice of a familiar device (i.e., mobile phone) eased the process of learning in the new program. The study did not provide results related to improved literacy teaching practices (Haagen & van Rensburg Lindzter, 2010).			

Project Title: PIEQ (Package for Improving Education Quality)	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 103
Location: DRC	Design: Pre-Post	Study URL: http://pdf.usaid.gov/pdf_docs/PDACU335.pdf	
	Outcome Cluster: Teacher Training		
Evaluation Abstract: In June, 2012, a Mid-Term Review was organized by EDC to take stock of project accomplishments and challenges and, importantly, to determine whether the original project design was still appropriate for meeting the project’s goals. The study was principally qualitative, in which over 400 project staff, partners and beneficiaries provided information on their experiences and perspectives concerning PIEQ			

Project Title: Pride Africa	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 113
Location: Kenya	Design: Pre-Post	Study URL: http://siteresources.worldbank.org/DEC/Resources/DrumnetCaseStudy.pdf	
	Outcome Cluster: Content Distribution		
Evaluation Abstract: This project developed a platform to create linkages between agricultural producers, buyers, agro-dealers, and banks. Working across five Kenyan provinces, DrumNet worked to link two large buyers, a commercial bank, and more than 3,000 smallholder farmers. DrumNet was set up to be a commercial, self-sustaining company, which will help the platform be sustainable longer.			

Project Title: “Trainer in your pocket”	Source: Educational Technology Topic Guide (DFID)		Source Document Page Number : 12
Location: Kenya	Design: Pre-Post	Study URL: http://www.tandfonline.com/doi/pdf/10.1080/19415257.2013.766232	
	Outcome Cluster: Teacher Training		
Evaluation Abstract: Examples of mobile phones being used with teachers to provide continuing professional development (CPD) in emerging economies at scale are largely absent from the research literature. We outline English in Action’s (EIA) model for providing 80,000 teachers with CPD to improve their communicative language teaching in Bangladesh over nine years. EIA’s CPD program is delivered face to face and supported through open distance learning (ODL). This innovative model of teacher CPD is supported through peer learning and self-study using a variety of print, audio and video resources. Drawing on the success of EIA’s pilot studies, where internal and external evaluation reported significant improvement in teachers’ and students’ English-language competence after one year, the current phase is using low-cost mobile phones, or the ‘trainer in your pocket’ to deliver CPD to 12,500 teachers through 2015. We believe EIA’s teacher CDP model is best suited to assist the project in achieving one of its primary goals: to increase the English-language proficiency of 12 million students, allowing them to access greater social and economic opportunities in the future. We argue EIA’s use of mobile phones for the provision of teacher CPD – at scale – is timely and replicable in both developed and developing contexts.			

Project Title: UNESCO Literacy Project	Source: Mobiles for Youth Workforce Development	Source Document Page Number : 119
Location: Pakistan	Design: Pre-Post	Study URL: http://unesco.org.pk/education/documents/Project%20Brief%20Paper_ICT.pdf
	Outcome Cluster: Literacy - Child	
Evaluation Abstract: This project is concerned with the problem of literacy retention among youth. It aimed to motivate youth to continually consolidate their literacy skills. The key idea of this project was to use mobile phones as a tool for delivering post-literacy training materials to youth. Messages contained pedagogically correct, fun, and interesting materials. SMS messages were used to reinforce lessons learned at the Learning Centers. To monitor the progress of the learners, they were given monthly examinations to assess their literacy skills. In one area, there were no learners who scored an A at the beginning of the program; by the end, 39% scored an A—showing marked improvement.		

Project Title: Using Mobile Phones to Accelerate Literacy Education and Empower Afghan Women	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 128
Location: Afghanistan	Design: Pre-Post	Study URL: Unavailable	
	Outcome Cluster: Literacy - Adult		
Evaluation Abstract: The program was intended for students who were newly literate; however, pre-tests issued by AIL to program participants revealed that the majority of participating students were illiterate and unable even to recognize the letters of the alphabet (Yacoobi, 2013b). After completing the 5-month long mobile literacy class, “83 percent of students were able to test out of two levels of literacy courses—a feat which ordinarily would have taken 18 months” (Yacoobi, 2013a). A small number of students were also able to read and understand magazines and newspapers. These students sent out an average of 1,750 messages in four months (Yacoobi 2013b). In addition to using the technology to complete their assignments, the program also allowed the students to socialize with each other beyond their usual scope (Yacoobi, 2013a).			

SINGLE TIME DESIGNS

Project Title: BBC Janala	Source: Mobiles for Reading Landscape (USAID)	Source Document Page Number : 59
Location: Bangladesh	Design: Single Time	Study URL: http://www.eiabd.com/eia/index.php/2012-10-11-09-41-47/research-publication/research-report/baseline-reports
	Outcome Cluster: 21 st Century Skills	
Evaluation Abstract: According to the project website, a number of studies were conducted between May 2008 and March 2010 on the promotion of English language by EIA. However, it is not evident if impact studies examining learning using mobiles were conducted. The evaluations that are available investigated program effectiveness in relation to effective teaching practices and student performance. EIA also conducted various baseline studies to examine use of language and education levels of participating students. Walsh and Shaheen (2013) reported a further study that showed a potential increase in the use of English in teaching following EIA implementation.		

Project Title: EdQual	Source: Educational Technology Topic Guide (DFID)	Source Document Page Number : 24
Location: Bangladesh	Design: Single Time	Study URL: http://r4d.dfid.gov.uk/PDF/Outputs/ImpQuality_RPC/EdqualFinalReport.pdf
	Outcome Cluster: Teacher Training	
Evaluation Abstract (from previous paper): The project centered around a large-scale collaborative professional development programme with mathematics and science teachers which built on the InterActive Education project (Sutherland et al, 2008), research and development work in Chile (Moenne et al, 2004) and the EdQual review of literature (Were et al, forthcoming). The research project involved 12 schools across Rwanda, selected against criteria which emphasized factors such as social deprivation, but also included basic minimum levels of ICT and associated infrastructure. Three of the schools were primary schools and nine were secondary schools, including both rural and urban schools.		

Project Title: EQUIP3	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 122
Location: 26 Countries	Design: Single Time	Study URL: www.equip123.net	
	Outcome Cluster: Workforce Development		
Evaluation Abstract: The evaluation does not consider the mobile component—Paje-Niéta—of this program in any real depth. However, the evaluation gives a good overview of the youth development and youth livelihood programming. Technology has become a significant consideration for livelihood and employment strategies and a tool for program and content delivery. Advances in technology during the existence of the EQUIP3 program, have been remarkable and have been incorporated into the program design in its later stages. Low-cost, high-quality technology provides a delivery system, which can provide access to skills and job information for hard-to-reach, informally organized populations as well as more cost-effective monitoring and evaluation. As this program is ongoing, other mobile components are likely to be implemented in the future. Paje-Niéta integrates appropriate information technologies in support of linkages that improve youth livelihoods, through agriculture market information, workforce opportunities, and job networking. It also enhances instruction and learning through the introduction of cell-phone based multimedia lessons. Multimedia applications pre-loaded on mobile phones provide alphabetic, numeric and phonetic lessons, as well as math drills and quizzes.			

Project Title: Hewlett-Packard Learning Initiative for Entrepreneurs (HP LIFE) Program	Source: Mobiles for Youth Workforce Development	Source Document Page Number : 125
Location: 49 countries inc China, India, Kenya, Nigeria and South Africa	Design: Single Time Outcome Cluster: Workforce Development	Study URL: http://theyouthalliance.org/sites/default/files/EDC-%20Technology%20in%20the%20HP%20Life%20Entrepreneurship%20Program.pdf
Evaluation Abstract: <p>The evaluation focused on testing two underlying assumptions regarding ICT tools on which the HP LIFE curriculum is based: Assumption 1: Increased application of ICT tools or software leads to improved employment and entrepreneurship outcomes among disadvantaged youth in developing countries .Assumption 2: Technology-based tools, such as online training content and games, increase program effectiveness. To test these two assumptions, EDC conducted process and outcome evaluations of the HP LIFE program. The outcome evaluation was conducted to test the first assumption of the LIFE curriculum and sought to answer the following questions:</p> <ol style="list-style-type: none"> 1. To what extent do graduates of the HP LIFE program experience increased incomes and other benefits as a result of the training? 2. To what extent do graduates of the HP LIFE program use the ICT tools in their business, employment, or search for employment? 3. To what extent did the ICT tools prove to be relevant to the businesses youth created or employment they found? <p>The study's process evaluation tested the second assumption that technology-based tools used as part of youth workforce development curricula increase program effectiveness by asking the following questions:</p> <ol style="list-style-type: none"> 1. How relevant do youth trainees find the HP LIFE curriculum and online tools to their needs for starting or strengthening micro-businesses or finding employment? 2. How effective is the use of technology in transferring skills and information to youth trainees? <p>The evaluation was conducted from November 2011 through April 2012 in China, India, Kenya, Nigeria, and South Africa. (Vinogradova, 2012)</p>		

Project Title: iHub	Source: Mobiles for Workforce Development		Source Document Page Number : 140
Location: Kenya	Design: Single Time	Study URL: http://www.ihub.co.ke/downloads/ihub_entrepreneurs_report.pdf	
	Outcome Cluster: Workforce Development		
Evaluation Abstract: This research aimed to understand the impact of the ICT Hubs to entrepreneurs. An ICT hub is a space where technologists congregate to bounce ideas around, network, work, program and design to bring their ideas to fruition. The first ICT Hub of the 15 hubs to be profiled within this study series is iHub, Nairobi's innovation Hub for the Technology Community. The study found that 100% of the entrepreneurs appreciate the iHub space as it has been a conducive and innovative co-working space that drives continuous networking through the events, community meetups that leads to collaboration and partnerships, sharing skills and knowledge through teamwork among others. This is likely because most of these talented entrepreneurs having graduated with no formal job opportunities, have had their talents and skills nurtured and housed under these hubs. Overall, the entrepreneurs believe that the iHub can further sustain this co-working spirit by building more capacity through communal projects and active virtual member interaction among others.			

Project Title: Interactive Radio Instruction (IRI) and Interactive Audio Instruction (IAI)	Source: Mobiles for Reading Landscape (USAID)		Page Numbers: 77
Location: Global	Design: Single Time	Study URL: http://www.equipl23.net/JEID/articles/4_2/HoThukral.pdf	
	Outcome Cluster: Literacy - Child		
Evaluation Abstract: An evaluation report demonstrated positive effect sizes for students participating in IRI in a variety of subjects and grade levels (Ho & Thukral, 2009). The validity of empirical design in assessing learning gains was the most commonly referenced limitation in the assessment findings.			

Project Title: International Children's Digital Library (ICDL)	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 79-80
Location: Global	Design: Single Time	Study URL: http://hcil2.cs.umd.edu/trs/2003-02/2003-02.pdf	
	Outcome Cluster: Content Creation		
Evaluation Abstract: In this paper we describe the first version of the International Children's Digital Library (ICDL). As a five-year research project, its mission is to enable children to access and read an international collection of children's books through the development of new interface technologies. This paper will describe the need for such research, our work in the context of other digital libraries for children, and an initial analysis of the first seven weeks of the ICDL's public use on the web			

Project Title: Millennium Villages Project	Source: Mobile Education for Numeracy (GIZ)	Source Document Page Number : 31
Location: Various	Design: Single Time	Study URL: http://cgisd.columbia.edu/files/2013/12/CIES-Abstract-What-drives-childrens-learning.pdf
	Outcome Cluster: School Administration	
Evaluation Abstract: The paper analyzes data collected in the Millennium Villages Project (MVP) clusters of Sauri (Kenya) and Mbola (Tanzania) in 2012-2013. School-level data includes information on student enrollment, school conditions, teachers' characteristics and teaching resources from primary schools in the MV clusters of Sauri (Kenya) and Mbola (Tanzania). These data sets were collected through a combination of interviews, classroom observations and school records, and captured using both smart phones and paper questionnaires. Household-level data includes demographic and socio-economic characteristics from 348 households in Sauri, and 354 households in Mbola. As part of the household data collection process, all household members between 5 and 16 years old were administered reading and numeracy tests developed by UWEZO. These are the same tests used in UWEZO's national Assessments in Kenya and Tanzania. Information regarding children's current schooling status, past school exposure and participation in child labor (in or outside the household) was also collected. The name of the school attended was also captured in the study, allowing us to link household- and individual-level information with school characteristics.		

Project Title: PAJEF Literacy Classes	Source: Mobiles for Reading Landscape (USAID)	Source Document Page Number : 99
Location: Senegal	Design: Single Time	Study URL: http://www.unesco.org/ui/litbase/?menu=13&programme=180
	Outcome Cluster: Content Distribution	
Evaluation Abstract: Monitoring of the quality of the programme is carried out by the DALN, and is organized on two levels. First, decentralized monitoring is undertaken by the Inspection Academy (<i>Inspection d'Académie</i>), the Minister of Education's representative in each region, and the Departmental Inspectorate of National Education (<i>Inspection Départementale de l'Education Nationale</i>). This ensures that all centres are inspected in a systematic way, based on decentralized monitoring, the tools available and the quality of inputs and learning. The Inspection Academy reports to the DALN, which is responsible for overseeing any improvements that need to be made. Second, centralized monitoring is carried out by the DALN. This makes it possible to assess how well the regional results conform to the programme objectives, and to find solutions to problems when they are identified.		

Project Title: PAJE Nièta (Support to Youth Entrepreneurs Project)	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 97
Location: Mali	Design: Single Time	Study URL: http://idd.edc.org/projects/mali-support-youth-entrepreneurs-project-paje-nieta	
	Outcome Cluster: Workforce Development		
Evaluation Abstract: No evaluation of the learning outcomes related to the PAJE-Nièta has been reported. One informal report states that 56 percent of youth who completed technical training with the PAJE-Nièta project have gone on to successfully start a micro-enterprise (Taggart, 2013).			

Project Title: Malawi Teacher Professional Development Support project	Source: Mobile Education for Numeracy (GIZ)		Source Document Page Number : 33
Location: Malawi	Design: Single Time	Study URL: http://alturl.com/2b72d	
	Outcome Cluster: Teacher Training		
Evaluation Abstract: As part of the United States Agency for International Development (USAID funded Malawi Teacher Professional Development Support project, a sub-task was the piloting of an alternative technology that could be used for improving the quality and consistency of teacher continued professional development (CPD). The pilot, which included 26 open and distance learning (ODL) student teachers, was launched in the spring of 2011 using a low-cost portable MP3 multipurpose device. A short course on numeracy, containing 5 weekly lessons, was piloted. Each lesson consisted of one or two readings, two videos, and an assignment that directed the learner to complete tasks and document their completion using the camera and audio recorder features of the media player. The viability of using the media player for CPD was evaluated on the ease of use, effectiveness of instruction, and potential for long-term scalability. The evaluation results demonstrated that, with a small amount of initial training, the devices were easy to use and they effectively deliver instruction. Scalability, however, is critical to the long-term success of an initiative based on these or similar devices. An analysis suggests that an affordable option worth considering is the systematic, shared use of media player devices within schools. This approach could dramatically reduce the cost of using this alternative technology for ODL training to pennies per lesson.			

Project Title: SenMobil – Kindergarten Mobile Learning	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 113
Location: Senegal	Design: Single Time	Study URL: http://www.senmobile.com/officialsenmobile/index.php/en/elearning-en	
	Outcome Cluster: 21 st Century Skills		
Evaluation Abstract: The pilot study included more than 90 pupils using 20 Blackberry phones in three schools in Senegal (SenMobile, 2012). It is not clear how phones were distributed or how much time in a given school day or week was dedicated to the project. Measured outcomes were not provided. However, Scharff (2012) reported that students were “proud” of the learning experience and that they were “motivated by mobile phones.”			

Project Title: Youth: Work Jordan	Source: Mobiles for Youth Workforce Development		Source Document Page Number : 121
Location: Jordan	Design: Single Time	Study URL: http://library.iyfnet.org/sites/default/files/library/YWJ_RCA_Full.pdf	
	Outcome Cluster: Workforce Development		
Evaluation Abstract: Young people in the communities served by this program recognized the social value of formal education, but did not see the practical value. Formal education only provides some practical and life skills they need to work. Many young people in these communities had a low level of education, drastically reducing their chances of getting employment. Vocational training is a reasonable alternative to other types of education, but there are negative stereotypes that dissuade youth from this path. Gender roles also limit the number of girls pursuing vocational education. While employment opportunities are available, companies state that the youth do not have the technical or “soft” skills required for these jobs. Providing the technical, life skills, and entrepreneurship training will help resolve this gap. Holistic career counseling is also needed to help youth identify sectors with opportunities, and paths that will lead to long-term careers.			

Project Title: Yoza Project (formerly m4Lit)	Source: Mobiles for Reading Landscape (USAID)		Source Document Page Number : 135
Location: South Africa	Design: Single Time	Study URL: https://m4lit.wordpress.com/	
	Outcome Cluster: Literacy - Child		
Evaluation Abstract: No impact evaluation has been conducted at the time of writing. However, research was conducted to assess digital literacies and indigenous literacies. Statistics on the number of m-Novel readers, and comments are available on the Reports page of the project website (http://yozaproject.com/reports/). In the project’s own tracking system, they note that over 63,000 users have added Kontax as a Mxit contact or, in other words, over 63,000 users have access to the m-Novels (Yoza Project, 2011).			

ANNEX I: SYNOPOSIS OF PUBLISHED ICT4E EVALUATION FINDINGS AND GAPS

This annex summarizes the findings of a scan of published sources for information on the evaluation of educational technology interventions, primarily those that focus on literacy and numeracy. Resources captured in this scan included policy statements on the importance of evaluating the effects of educational technology interventions as well as information about the existence, quality, and findings of impact evaluations and other rigorous studies of the effects of educational technology on learning.

While the promise of ICT4E initiatives has been consistently promoted internationally, as well as domestically,⁷ it is also recognized in various periodic evidence reviews that the effectiveness of educational technology in improving student outcomes, as well as student attitudes, is largely descriptive or based on correlations from pilot projects and program evaluations. Rigorous tests which examine the effects of specific education technology interventions compared to a defensible counterfactual are still rare.

In perhaps the most systematic review of evaluation quality in this field, Cisco Systems, in its 2006 report *Technology in Schools: What the Research Says*,⁸ documented both descriptive and “rigorous studies” – what USAID refers today as Impact Evaluations – for a number of technologies being employed in classrooms. In the analysis, as shown in Table I of this Annex, Cisco reported the general direction (positive, negative, neutral) of the extant research. More recent reviews of evidence of the impact of educational technology, including from 2008,⁹ 2009¹⁰ and 2014¹¹ (all of which focus on developing countries) echo Cisco and other reports in finding that a paucity of rigorous evaluations forces funding organizations and the general public to rely on a general sense that technology may enhance learning, rather than solid evidence, when making decisions.

While the overall impression from studies that examine educational technology effects is positive, the types of studies from which this conclusion arises differ widely; as do estimates of the size of technology’s effect, or practical significance of such technologies on learning. Meta-analyses of the most rigorous studies available (i.e. those that used experimental or quasi-experimental designs) suggest that the effects of technology on learning are positive yet modest. For example, a synthesis of effect size findings prepared for the U.S. Department of Education in 2002¹² found that, on average, educational technologies of all types have a moderate effect (roughly .35 using Cohen’s *d*) across learning arts and

⁷ Domestically, calls for more consistent and rigorous evaluation of educational technology interventions are longstanding, including Cuban’s landmark 2001 study, *Oversold and underused: Computers in the Classroom*, the 2004 ACT policy report on the effectiveness of technology in U.S. schools, and more recently, Winthrop and Smith, in the 2014 Brookings Institution working paper, *A New Face of Education*.

⁸ Lemke, Cheryl et.al. *Technology in Schools: What the Research Says*. Cisco Systems, 2009 available at: http://www.cisco.com/web/strategy/docs/education/tech_in_schools_what_research_says.pdf As a caveat, this meta-analysis focuses on specific technologies, rather than specific technology-based interventions.

⁹ Gulati, Shalni. *Technology-Enhanced Learning in Developing Nations: A review*, Oxford University, 2008, available at: <http://www.irrodl.org/index.php/irrodl/article/view/477/1012>

¹⁰ Tolani-Brown, Nikita, et.al. *An Analysis of the Research and Impact of ICT in Education in Developing Country Contexts*. *Journal of Education for International Development* 4:2 December 2009 available at: http://www.equipl23.net/JEID/articles/4_2/Tolani-BrownMcCormacZimmermann.pdf

¹¹ McEwan, Patrick J. *Improving Learning in Primary Schools of Developing Countries: A Meta-Analysis of Randomized Experiments*, 2014 available at: <http://academics.wellesley.edu/Economics/mcewan/PDF/meta.pdf>

¹² Murphy, Robert F., et. al. *E-DESK: A Review of Recent Evidence on the Effectiveness of Discrete Educational Software*. SRI International, 2002. available at: http://www.sri.com/sites/default/files/publications/imports/Task3_FinalReport3.pdf

mathematics in the U.S. In 2011, an update based on multiple previous meta-analyses reached essentially the same conclusion.¹³

TABLE 1: EDUCATIONAL TECHNOLOGIES BY TYPE OF LEARNING AND TYPE OF RESEARCH. CISCO SYSTEMS, 2006

TECHtypes	Type of Learning									
	Basic Skills		Higher Level Thinking		Information, Communication & Technology (ICT)		Collaboration/ Participatory Learning		Engagement in Learning	
	Exp	Corr/Des	Exp	Corr/Des	Exp	Corr/Des	Exp	Corr/Des	Exp	Corr/Des
Interactive Whiteboards (IWB)	+/-	+		+	+	+	+/-	+	+	+
Classroom Response Systems	+	+		+/-		+/-	+	+		+
Video Games	+	+	+/-			+	+	+	+	+
Simulations		+	+/-	+		+	+	+	+/-	+
Modeling		+	+	+	+	+		+		+
Augmented Reality (AR)	+	+		+		+		+		+
Virtual Worlds	+/-	+		+		+		+		+
Mobile Devices	+	+		+		+		+		+
Calculators	+/-	+/-	+		+	+			+	+
1:1 Ratio Of Computers To Students	+/-	+	+/-	+/-	+	+	+/-	+/-	+	+
Virtual Learning	+/-	+	+		+	+	+	+	+	+
Data Visualization/Analysis Tools	+	+	+	+		+				+
Computer Assisted Instruction (CAI)	+/-	+/-	+/-	+/-		+		+		+
Educational Television	+	+		+	+	+	+	+	+	+

NOTE: "+" indicates primarily promising findings; "+/-" indicates mixed findings; and "-" indicates primarily negative findings. The "Experimental or Quasi-Experimental" category of research is noted above by "Exp", and the "Correlational or Descriptive" category is noted by "Corr/Des".

However, the reported effect sizes depend heavily on the inclusion criteria applied when identifying relevant studies. In 2011, researchers linked educational technology outcomes with teaching approaches more closely than previous studies¹⁴ and found a higher average effect size (.42, using Hedge's g)¹⁵. However, another study which utilized stricter inclusion criteria found the average effect size to be lower than previously believed (.16).¹⁶ This second study also concluded that larger studies ($n > 250$)

¹³ Tamim, Rana M., et al. What Forty Years of Research Says About the Impact of Technology on Learning : A Second-Order Meta-Analysis and Validation Study. Review of Educational Research, 2011 available at: <http://www.scribd.com/doc/76936904/Rana-Tamim-Et-Al-2011-what-Forty-Years-of-Research-Says-About-the-Impact-of-Technology-on-Learning>

¹⁴ Since 2009, an inter-ranking of all types of education interventions, constructed by John Hattie, which considers an effect size of 1.0 to be equivalent to a full school year or grade level improvement, have usefully disaggregated various teaching strategies and education technologies, showing where they stand in relation to each other. <http://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/>

¹⁵ Lee, Yuan-Husan, et., al. Revisit the Effect of Teaching and Learning with Technology. Educational Technology and Society, 2011 available at: http://www.ifets.info/journals/16_1/12.pdf

¹⁶ Cheung, C.K and Robert E. Slavin. The effectiveness of educational technology applications for enhancing mathematics achievement in K-12 classrooms: A meta-analysis. Educational Research Review, 2013 available at: <http://www.sciencedirect.com/science/article/pii/S1747938X13000031>

and those using experimental designs show smaller differences (effect sizes) than do smaller studies and those using quasi-experimental designs. On the program side, intensity of use of educational technologies did not yield important differences, but the types of intervention did. What were described as comprehensive model studies produced a larger effect size, +0.28, while other studies, including those of computer-managed learning, averaged around +0.18. However, due to the small number of included, relevant studies, the meta-analysis authors caution against over-interpreting differences by program type.

While this literature shows that effect sizes are often small or moderate, relatively small effect sizes in education interventions can, nonetheless, have practical significance, as Figure 1 below illustrates.

FIGURE 1: RELATIONSHIP BETWEEN EFFECT SIZE AND GRADE LEVEL PROGRESS

In the U.S., results from multiple standardized tests show that from Grade 2 to Grade 3, children advance on average a whole school year (in learning terms). This equates to a .60 gain in reading.				
Now consider:				
Innovative Intervention Effect Size	.15	.30	.45	.60
Grade Effect (year)	+1/4	+1/2	+3/4	+ 1

Source: Jeff Davis, Management Systems International

On the international side, until quite recently, reviews of technology and educational attainment have generally considered both quantitative and qualitative research findings, and have found educational technology to be a positive addition to intervention research. However, a majority of studies have not reported findings on an effect-size basis, which limits the comparability of programs.¹⁷ In 2014, however, a new meta-analysis, by McEwan, of 77 rigorous studies conducted over the past decade made use of effect sizes to identify promising intervention for educational attainment.¹⁸ Findings from this study, based on 31 of the 77 reports, showed gains from computers and other technology to be lower (i.e., have an average effect size of .15) than was found for U.S. domestic applications. The author attributes the difference to lower accessibility to technology as well as parental and teacher familiarity with available techniques in developing countries, and suggests the integration of any one educational intervention into a more holistic framework. A similar conclusion was reached through randomized controlled trials funded by the Inter-American Development Bank of the “One Laptop per Child” program in Peru, when findings showed no significant differences in standardized math and language arts tests for children who did and did not receive personal computers, although this study did reveal some gains in cognitive ability.¹⁹

¹⁷ Gulati, Shaini. Technology-Enhanced Learning in Developing Nations: A Review. International Review of Research in Open and Distance Learning, 2008 available in <http://www.irrodl.org/index.php/irrodl/article/view/477/1012> and Tolani-Brown, Nitka, et., al. An Analysis of the Research and Impact of ICT in Education in Developing Country Contexts. Journal of Education for International Development, 2009.

¹⁸ Op. cit.

¹⁹ Vota, Wayan, What Can We Learn from Randomized Controlled Trials of OLPC Peru? At www.technologysalon.org, 2012

Implications for Future Research and Evaluations

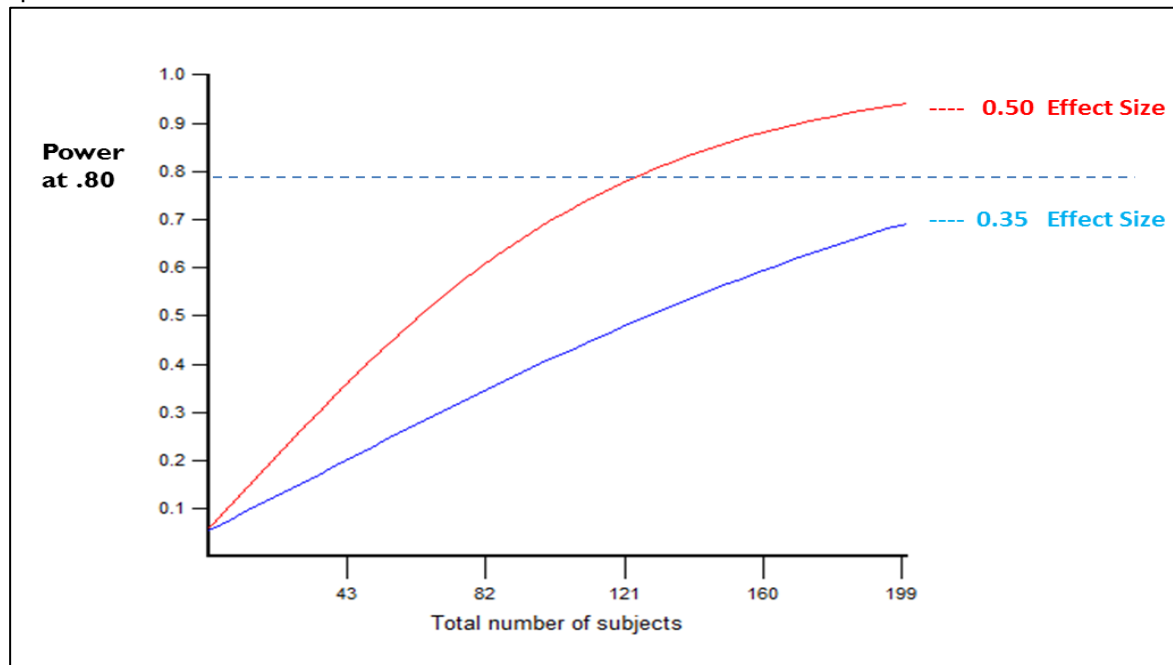
Based upon an analysis of the available evidence, it is clear that more studies are needed to develop an accurate understanding of the impact of specific educational technologies on schools, teachers and student behavior, and performance. Many of the studies included in the reported meta-analyses were “proof of concept” (efficacy) type studies that looked at the effect of a particular technology *if* it was used and engineered ideal circumstances which it was used to measure the feasibility of the approach.

The general finding from these studies was that the effect of individual ICT4E interventions varied widely, but averaged around .35 in the aggregate. The effect size found has implications for the design of new studies and impact evaluations carried out by USAID and other donors. When designing impact evaluations, it is necessary to calculate the statistical power necessary to achieve significant results and to avoid Type I or Type II errors. The expected effect size is a required input into this calculation, with the “default” value being .50 (a moderate size effect). In practice, ICT4E interventions have a lower average. As a result, researchers need to be aware that ICT4E evaluations may require a larger sample size than other educational interventions to accurately detect an effect. This concept is illustrated in Figure 2.

FIGURE 2: IMPORTANCE OF EFFECT SIZE FOR THE NUMBER OF OBSERVATIONS NEEDED FOR AN ADEQUATELY POWERED IMPACT EVALUATION

A Special Consideration for ICT4E Impact Evaluations

Broadly speaking, guidance for conducting impact evaluations across countries and sectors suggests that when planning an impact evaluation, evaluators aim for being able to detect an effect size that falls in the moderate range. The conventional specification for a moderate effect size is .50 (Cohen's *d*) with a large effect size in this schema being .80 and a small effect size being .20. When using a power calculation to determine how many subjects will be needed for an experimental design, at the individual level, for example, entering .50 as the minimum effect size one wanted to be able to detect, the answer, with a confidence interval of .05 and power at the accepted norm of .80, would be around 120. But for an ICT4E evaluation, this would not necessarily be the right answer, since multiple meta-analyses over the years have reported the average effect size for ICT4E interventions to be .35 or less, meaning that for some interventions the effect size could be much lower. In the figure below, the implications for the number of people needed in the simplest type of experimental design if the minimum detectable effect size is set at .35 becomes clear – the study population size goes up, and it would go up even further if a more conservative minimum detectable effect size of .20 were used.



Source: Management Systems International Certificate Course in Evaluation

ANNEX 2: IMPACT CASE STUDIES

Not all evaluation designs are created equal. In order to establish a causal link between an intervention and the observed outcomes, it is necessary to create a strong counterfactual; or put another way, you need to somehow measure what would have happened in the absence of the intervention itself. Establishing a credible counterfactual is at the heart of evaluation and only certain evaluation designs address this concern. In the following section, examples of two examples of designs that address causality are flushed out to better illustrate their respective strengths and weaknesses: an RCT and a quasi-experimental design. RCTs are commonly referred to as the “gold standard” of evaluation because randomization between conditions replicates the counterfactual by ensuring treatment and control groups only vary in their exposure to the program rather than some unmeasured characteristic. Quasi-experimental designs artificially create a counterfactual through the intentional selection of comparable groups by the research team.

IMPACT EVALUATION CASE: Project ABC	
Program:	Project Alphabétisation de Base par Cellulaire (ABC)
Countries:	Niger
Evaluation Methodology:	Randomized Control Trial

Background:

Project ABC is a collaborative initiative between Catholic Relief Services, Tufts University and the University of Oxford that uses mobile phones as a tool to promote adult literacy and numeracy in Niger. The program has been implemented in over 110 villages and evaluated using a phased-in cluster randomized control trial design. Villages were randomized between conditions with roughly half receiving an adult education program with instruction on how to use a mobile phone (Project ABC) and half receiving only the adult education component.

Results:

Project ABC was correlated with statistically significant gains in literacy and numeracy for participants compared to those who only received the adult education program. These gains depreciated over time, but the relative improvement in participants seem to persist over time, particularly for math.

Methodological Strengths:

- The cluster randomized trial design stratified villages by region and administrative division within Niger; which increases the comparability between treatment and control groups by reducing within group variance (increasing intracluster correlation)
- The phase in design allows all potential beneficiaries to receive the intervention eventually.
- The design collected student level test scores, attendance data, as well as information on teacher quality and household socio-economic characteristics.

Methodological Weaknesses:

- The results from this study have been reanalyzed several times for a variety of outcomes including a recent paper on agricultural outcomes. Though the intervention may have had a number of unanticipated results, reanalyzing the same data set for statistically significant relationships leads to an increased likelihood of a Type I error (false positive results).

Project website: <http://sites.tufts.edu/projectabc/>

IMPACT EVALUATION CASE: Bridge IT	
Program:	BridgelT
Countries:	Various
Evaluation Methodology:	Quasi-experimental design

Background:

A joint program between Nokia and the Pearson Foundation, BridgelT was first launched as “Text2Teach” in the Philippines in 2003, BridgelT has been since been implemented within Tanzania, Chile, Colombia, India, Bangladesh, Indonesia, Nigeria, South Africa, Haiti, and Vietnam. The program aims to use mobile technology to reach previously inaccessible classrooms in the developing world and to provide teachers in these schools with contemporary and locally relevant teaching materials. The program has been evaluated in numerous contexts using a clustered quasi-experimental design (non-randomized comparison groups).

Results:

Bridge IT has been consistently correlated with student learning gains in science, math, and English as well as teaching quality for instructors when compared with control schools.

Methodological Strengths:

- Numerous independent evaluations have managed to replicate results in countries throughout the world.
- Although allocation is not random, schools are pair matched on a number of criteria prior to implementation of the intervention.

Methodological Weaknesses:

- Non-randomized control groups leaves open the possibility the experimental and control groups were different before the intervention took place (selection bias)
- Potential Matthew Effect (those in a position to take advantage of an intervention are the most likely to succeed) as the positive results are not equally distributed among participants.
- Although the results are generally positive, a number of studies are underpowered because of the small number of schools included in the evaluation; as a result many of the results are not statistically significant.

Source: <http://www.educationinnovations.org/program/bridgelt>